WeaveGrid

ILLINOIS COMMERCE COMMISSION

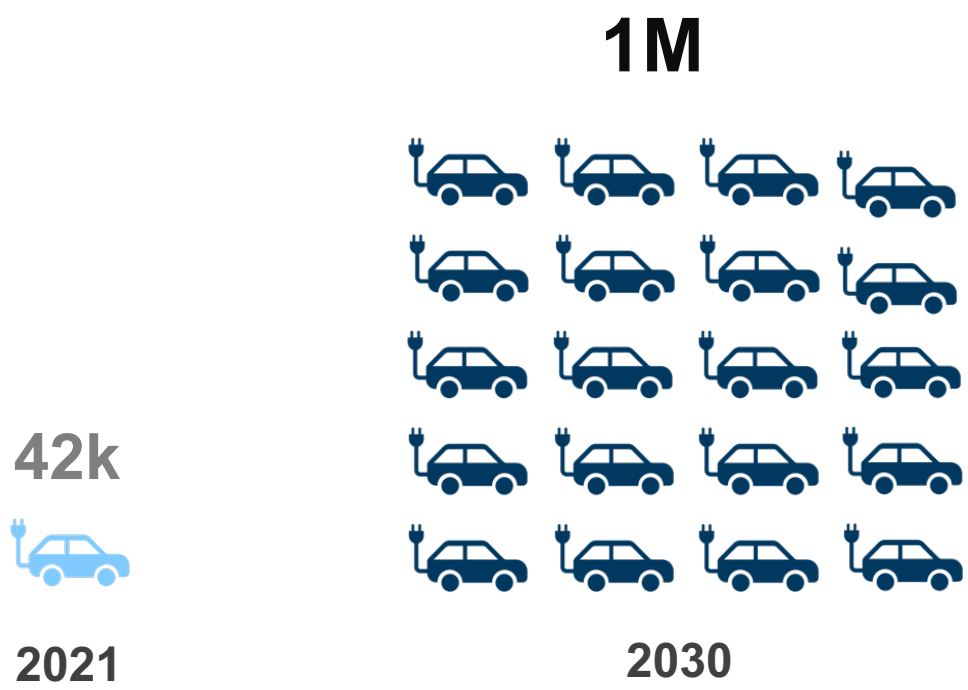
ICC

September 9, 2021

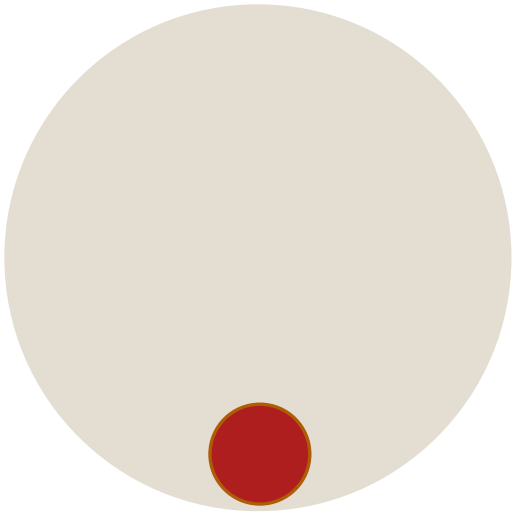
Two industries under digital transformation

Today, there is significant potential for residential rates and managed charging in Illinois

Illinois EV Growth



Managed Charging Opportunity



42k+ EVs in Illinois today

<15% EVs participating in managed charging and rates programs*

~180 MW of untapped flexible load today

Sources: Alliance for Automotive Innovation (2021); EIA Form 861

**Estimate based on customers participating in residential time-varying rates*

WeaveGrid's key principles for the residential EV charging experience

Driver First

- Consider mobility as customer need first and foremost
- Avoid assumptions based on EV first adopter behavior
- Promote rewards, not penalties

Evaluate Driver Experience & Utility Need

- Keep industry complexity and terms away from consumers
- Simplify experience across multiple program types
- Minimize balkanizing EV experience by utility territory

Continuous Management

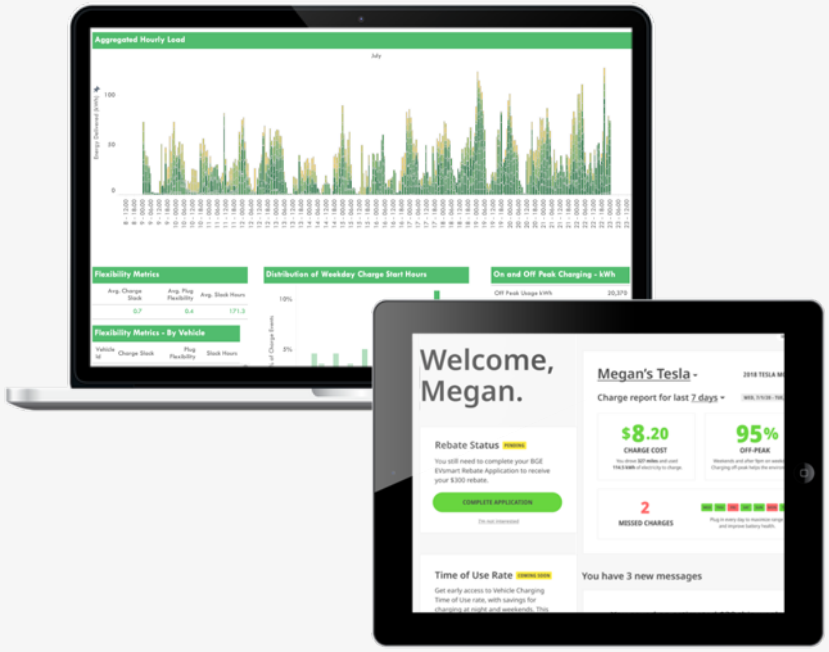
- Focus on continuous optimization
- Optimize for local and bulk system constraints
- Transition from reactive to proactive

Pathways for utilities to advance residential EV programs

Solution	Objectives
Monitoring & Rates e.g., rebates, time-varying rates	▪ Understand charging patterns ▪ Identify risks to grid ▪ Shape charging behavior ▪ Enable billing for EV-only rates
Managed Charging e.g., time-varying rates optimization, load mgmt.	▪ Meet driver preferences ▪ Manage for EV/off-peak rates ▪ Activate load shifting
System Orchestration e.g., distribution automation	▪ Integrate with AMI, GIS, DMS ▪ Co-optimize for bulk & distribution system constraints ▪ Unlock full EV-grid value

Insights for both customers and utilities

Utility-facing Analytics & Automation



EV Driver Engagement

Leveraging embedded EV telematics provides optimal outcomes for utilities and customers

Features:	Benefits:
Data – High-quality data and control via embedded vehicle telematics in conjunction with auto OEMs	Better information (e.g., battery level) to optimize managed charging around customer preferences
Access - No additional purchases required since telematics are embedded in the vast majority of all EVs, and compatible with any EV supply equipment	Increased program adoption and equitable access for all customers
Control - Maximizes resource flexibility for the electrical grid	Actively manage system constraints and avoid/defer infrastructure upgrades

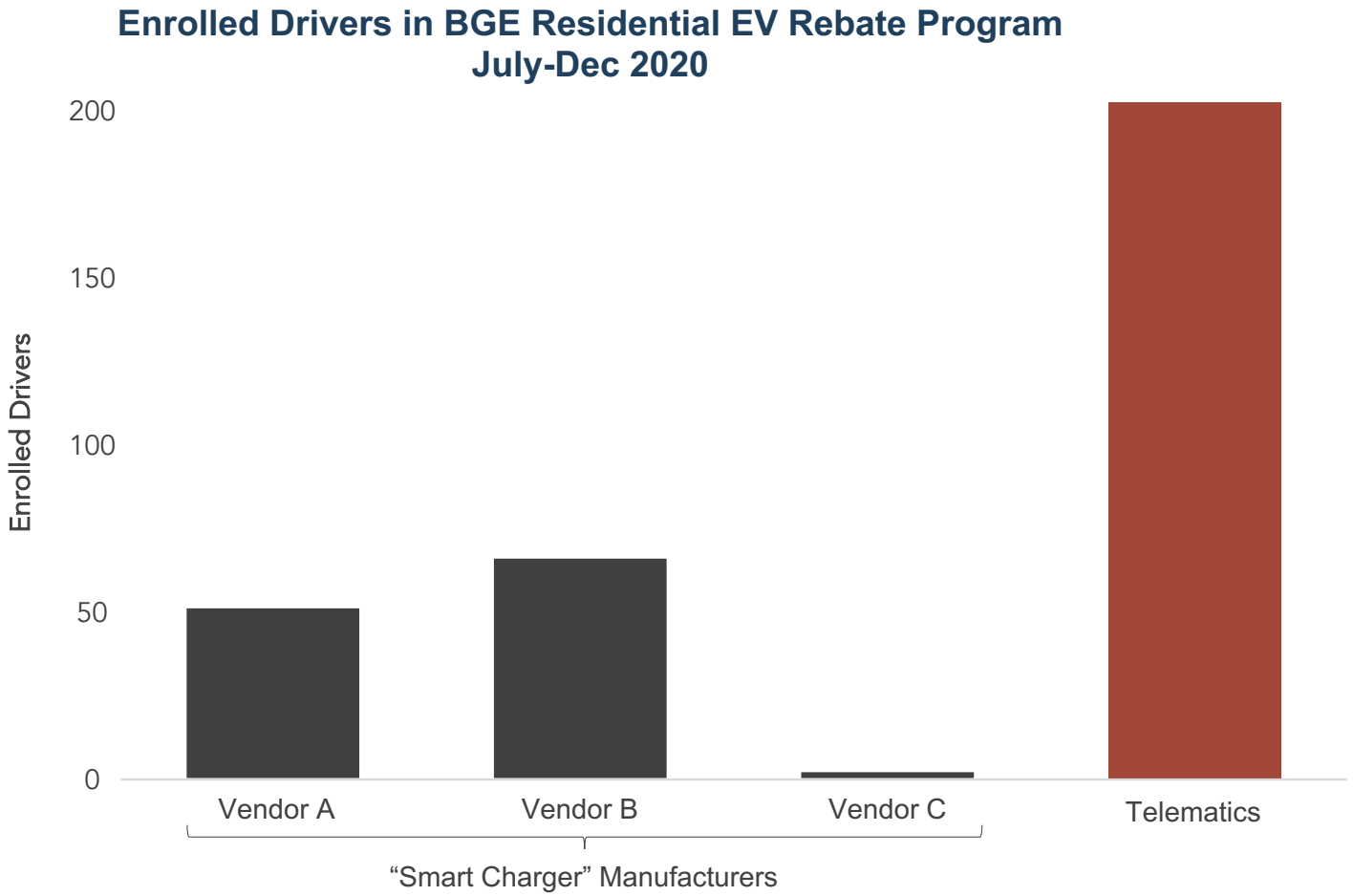
Built-in EV data

Charger-agnostic

Works with L1 and L2 Chargers

Case Study: Maryland and Baltimore Gas & Electric use alternative technologies for monitoring and time-varying rates

Case Study



Outcomes:

- Rapidly accelerated driver enrollment
- Expansion from Rebate to TOU program
- Expansion to Pepco & Delmarva

Additional Stats for Telematics:

- >1,000 registrations as of Aug 2021
- Avg. signup time: ~2 min
- 4.7/5 User Satisfaction

Source: BGE Semi-Annual Progress Report to the Maryland PSC regarding EV Programs, Jan 2021

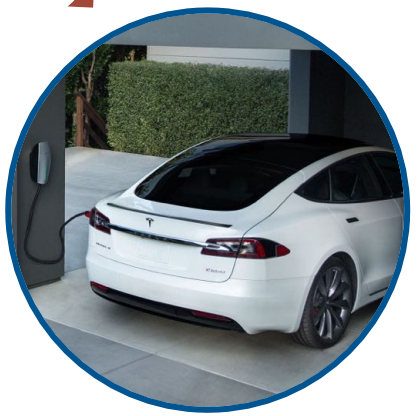
Case Study: Large IOU manages EV charging based on wind price forecasts

Problem:

Large IOU experienced **excess wind generation** during off-peak hours, resulting in wind curtailment

Solution:

- The utility has partnered with WeaveGrid to implement a **first-of-its-kind program** designed to reduce wind curtailments by **shifting EV charging load to hours of high expected wind generation**
- WeaveGrid will actively manage utility customers' EV charging based on data provided by utility
- Program will help **increase integration of renewables** while **lowering costs to serve EV charging**



Enabling new connections to create value for all stakeholders

Utility

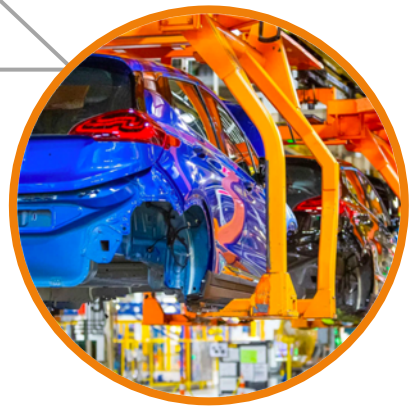
Access to data and controllable load resource

✓ Reliability & Cost Avoidance

Driver

Direct incentives, better rates, lower EV cost of ownership

✓ Savings & Satisfaction



Auto OEM

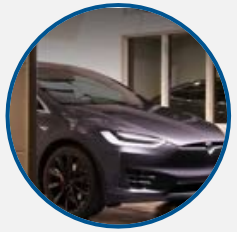
EV market uptake and data monetization

✓ Higher Sales & Profit

Appendix

Electric vehicles represent demand growth, but also strain at the grid edge

Driving Forces



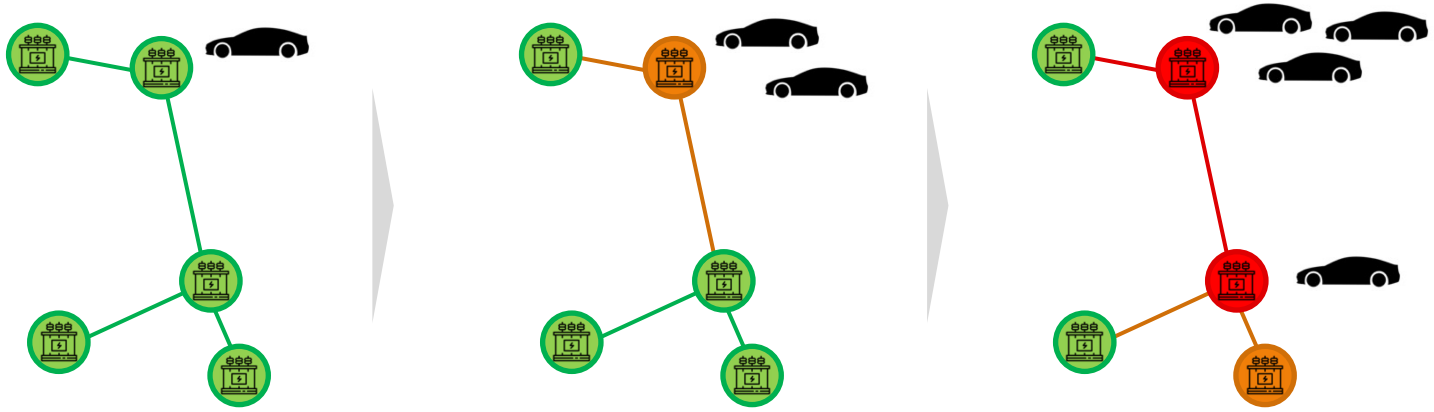
80% of charging happens at home
Starting in the evening, extending overnight

Level 2 charger = 2-3 homes' demand
5-10 kW EV charge vs. 3-5 kW home peak

EV adoption is very clustered
"Keeping up with Joneses" effect

Local transformer supports 4-8 homes
But utility knew where homes would be built

Overloading from new EVs leads to: Asset aging & Asset failure



UtilityCo

Illustrative Distribution Segment

EV adoption

Distribution node (e.g., transformer)

Distribution wiring

1x EV

Customer enrollment in TOU programs is an important step in utilities' journeys towards active managed charging

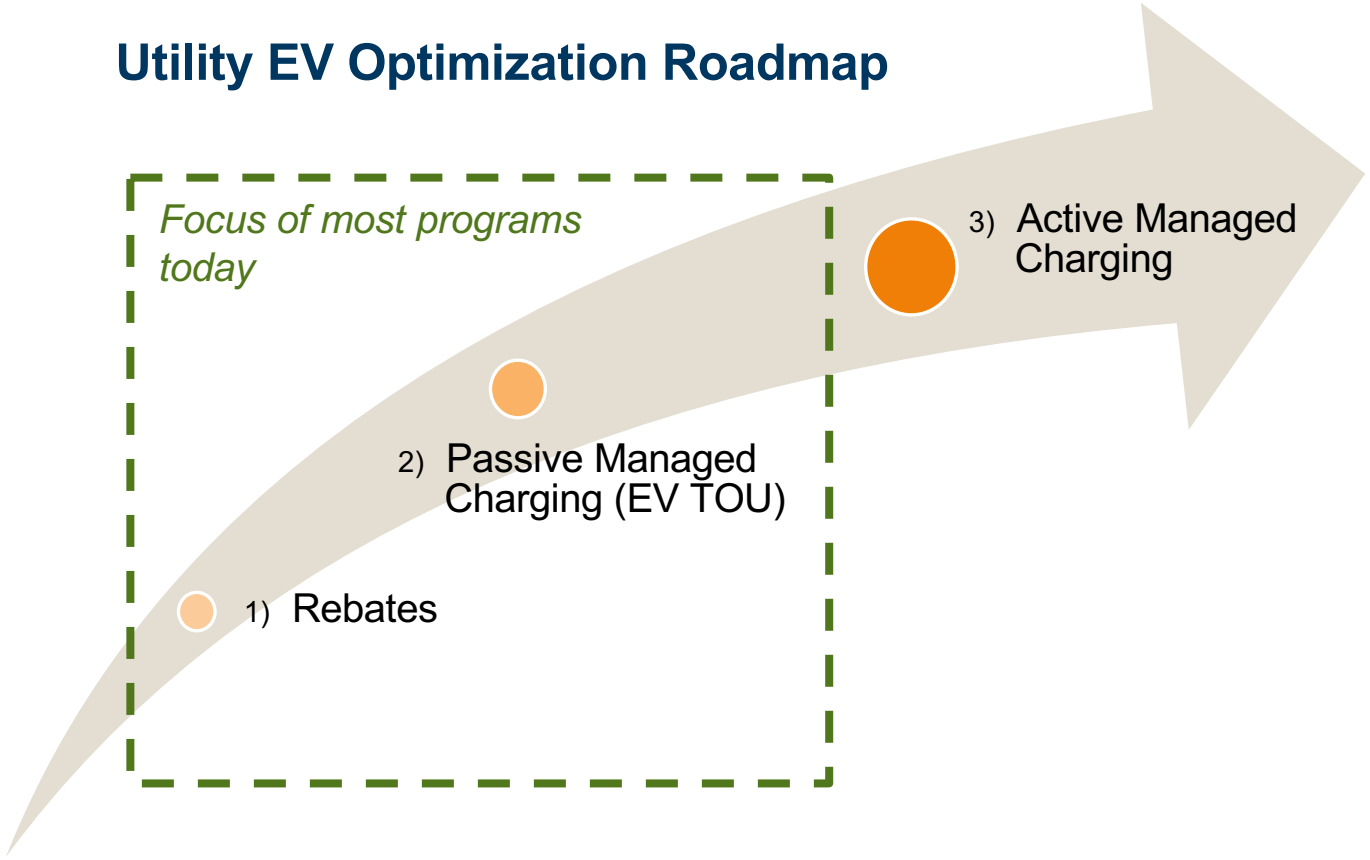
91%

Percentage of charging done off-peak by EV-only TOU participants

vs.

82%

Percentage of charging done off-peak by EV customers on standard residential tariff



Source: WeaveGrid data on 218 BGE TOU enrollments as of 6/7/2021 (61% of EV TOU program participants)